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COGENERATION PROJECTS FOR STATE FACILITIES

BACKGROUND

THE STATE COMPLETED A TECHNICAL STUDY OF THE POTENTIAL FOR COGENERATION SYSTEMS IN STATE OWNED FACILITIES IN 1987 AND RECENTLY HELD PUBLIC HEARINGS TO RECEIVE PUBLIC COMMENT ON THE STUDY FINDINGS. TESTIMONY WAS PRESENTED BY A RANGE OF INTERESTED PARTIES (CONSULTANTS, DEVELOPERS, STATE AGENCIES, EQUIPMENT MANUFACTURERS, ENERGY SUPPLIERS,) WHICH FOCUSED ON SIX GENERAL AREAS WHICH ARE OF SPECIAL INTEREST TO THE STATE:

GOVERNMENT DOCUMENTS COLLECTION
MAY 9 1988
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TECHNICAL FEASIBILITY
ENVIRONMENTAL IMPLICATIONS
INVESTMENT STRATEGY
O & M
INSTITUTIONAL ORGANIZATION FOR IMPLEMENTATION
CONTRACTUAL ISSUES WITH UTILITIES

FOLLOWING THE REVIEW OF PUBLIC COMMENTS AND AN INVESTIGATION OF THE COGENERATION EXPERIENCES OF OTHER STATES (CA, FLA, NJ) WITH COGENERATION AT STATE FACILITIES, THE STATE DECIDED TO IMPLEMENT A COGENERATION PILOT PROGRAM AT SEVERAL (3) STATE OWNED FACILITIES. THE PILOT PROGRAM WILL BE CARRIED OUT JOINTLY BY DCPO AND EOER ALONG WITH THE SELECTED HOST STATE AGENCIES (eg DOC, DMH, DMR, BOR, DPH). THE PURPOSE OF THE PILOT PROGRAM IS TO TEST AND REFINE THE VARIOUS TECHNICAL, FINANCIAL, ENVIRONMENTAL AND CONTRACTURAL ISSUES THROUGH THE IMPLEMENTATION AND OPERATION OF SEVERAL COGENERATION SYSTEMS. INFORMATION AND EXPERIENCE GAINED FROM THE PILOT PROGRAM WILL ALSO PROVIDE DIRECTION FOR THE ROLE OF STATE PARTICIPATION IN FURTHER COGENERATION DEVELOPMENT, REFINE CRITERIA FOR FACILITY AND SITE SELECTION, CREATE MODEL PROCUREMENT DOCUMENTS AND CONTRACTS AND PROVIDE THE BASIS FOR ACHIEVING SUCCESSFUL INSTALLATIONS.

ENVIRONMENTALLY ACCEPTABLE CONDITIONS.

PILOT PROGRAM PLAN

THE STATE IS CURRENTLY SELECTING SITES AND PREPARING AN RFP FOR THE PILOT PROJECTS. IT IS ANTICIPATED THAT SEPERATE RFP'S WILL BE ISSUED IN THE SUMMER OF 1988 FOR EACH SELECTED SITE FOLLOWING THE PREPARATION OF TECHNICAL DATA REQUIREMENTS FOR EACH SITE INCLUDING ENERGY PROFILES, ENERGY RATE DATA, AND CENTRAL UTILITY PLANT DESCRIPTIONS. AN ENGINEERING CONSULTANT WILL BE SELECTED FOR THIS TASK OF PREPARING TECHNICAL DATA, INCLUDING A DESCRIPTION OF EXISTING CONDITIONS OF THE THERMAL AND ELECTRICAL SYSTEMS AND FUTURE PLANS FOR ENERGY CONSERVATION IMPROVEMENTS AT EACH SITE.

THERE ARE A NUMBER OF CRITERIA USED IN SELECTING SITES FOR NEW COGENERATION SYSTEMS. THE COMMON BASIS FOR SELECTION IS THE LEVEL OF ENERGY EFFICIENCY. SELECTED SITES WILL HAVE ACHIEVED A REASONABLE LEVEL OF ENERGY EFFICIENCY AND WILL ALSO HAVE STABLE AND PREDICTABLE ENERGY LOADS. A MAJOR OBJECTIVE IS TO ENSURE THAT CAPITAL INVESTMENT IN ENERGY CONSERVATION MEASURES IS THE FIRST PRIORITY SO THAT THE COGENERATION SYSTEM INVESTMENT IS COST EFFECTIVE IN TERMS OF ENERGY EFFICIENCY IMPROVEMENTS.

THE PILOT PROGRAM SHOULD BE FULLY IMPLEMENTED BY EARLY 1990. ADDITIONAL COGENERATION PROJECTS MAY BE INITIATED IMMEDIATELY FOLLOWING THE PILOT PROGRAM.
IT IS ANTICIPATED THAT WIDE SCALE IMPLEMENTATION OF COGENERATION SYSTEMS AT A LARGE NUMBER OF STATE FACILITIES (50-60) COULD BE ACCOMPLISHED WITHIN A TEN YEAR PERIOD.

THE OPPORTUNITIES FOR COGENERATION AT STATE OWNED FACILITIES [illegible] SUBSTANTIAL AND DIVERSE IN TERMS OF GEOGRAPHIC LOCATION, UT[illegible]

TERRITORY; FUEL AVAILABILITY; SITE AND FACILITY SIZES; METHODS OF HEATING AND COOLING; SCHEDULE OF FACILITY OPERATION; PROCESS AND SPACE HEATING LOADS; CENTRALIZED AND SATELLITE THERMAL DISTRIBUTION SYSTEMS; AGE, CONDITION AND ENERGY EFFICIENCY OF FACILITIES; OPPORTUNITIES FOR REPLACING OR MODIFYING EXISTING THERMAL SYSTEMS; AND OPPORTUNITIES FOR THE SALE OF EXCESS THERMAL ENERGY.

THE RESULTS OF THE PILOT PROGRAM WILL NOT ADDRESS ALL OF THE DIVERSE CONDITIONS WHICH ARE ASSOCIATED WITH STATE OWNED FACILITIES BUT WILL PROVIDE A SOLID BASE FROM WHICH THE STATE CAN MOVE FORWARD WITH CONFIDENCE IN THE RIGHT DIRECTION CONCERNING APPROPRIATE FINANCING, OWNERSHIP, OPERATION AND MAINTENANCE ARRANGEMENTS FOR COGENERATION SYSTEMS.

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THE AGE AND CONDITION OF THE POWER PLANT AT UMA REQUIRES IMMEDIATE ACTION TO IMPLEMENT A REPLACEMENT POWER PLANT. THE THERMAL AND ELECTRICAL LOADS (300,000 pph/20MW) AT THIS SITE REPRESENT THE LARGEST OF ALL STATE OWNED FACILITIES (APPROXIMATELY 10 to 20 TIMES THE SIZE OF MOST STATE FACILITIES). ENGINEERING SERVICES FOR A POWER PLANT REPLACEMENT STUDY FOR UMA WERE ADVERTISE IN JAN 1988 AND THE DSB IS IN THE PROCESS OF SELECTING A FIRM FOR THIS STUDY. AS PART OF THE STUDY PROCESS, COGENERATION SYSTEMS AS WELL AS CONVENTIONAL POWER PLANT WILL BE EVALUATED ALONG WITH ALTERNATIVE FINANCING AND OWNERSHIP ARRANGEMENTS. DURING THE COURSE OF THE STUDY THE STATE WILL DECIDE ON BOTH THE TYPE OF PLANT AND AND PRIVATE OR PUBLIC OWNERSHIP AND DEVELOPMENT. THESE DECISIONS SHOULD BE MADE BY MID 1988.

IF THE PLANT IS PUBLICLY FINANCED, THE STATE WOULD ADVERTISE FOR DESIGN ENGINEERING SERVICES TOWARD THE END OF 1988.

IF PRIVATE FINANCING IS SELECTED, THE STATE WOULD ADVERTISE FOR PRIVATE DEVELOPER PROPOSALS AT THE END OF THIS YEAR.

LONG RANGE POTENTIAL FOR COGENERATION

THE STATE-WIDE STUDY OF THE POTENTIAL FOR COGENERATION AT STATE OWNED FACILITIES INDICATED (BASED UPON A 3-5 YEAR PAYBACK) THERE IS A POTENTIAL FOR 245 MW OF COGENERATED POWER AT A CAPITAL COST OF $215 MILLION. THIS IS BASED UPON THE USE OF HIGH OUTPUT, HEAVY FUEL DIESEL BASED ENGINES AT APPROXIMATELY 60 STATE FACILITIES (NOT INCLUDING UMA). THE COGENERATED HEAT PRODUCED WOULD PROVIDE APPROXIMATELY 35% OF THE HEAT CURRENTLY USED AT ALL STATE FACILITIES. THE POTENTIAL FOR 245 MW OF NEW COGENERATED POWER AT STATE FACILITIES REPRESENTS ABOUT 25% OF THE EXPECTED LOAD GROWTH (1,000 MW) IN NEW ENGLAND DURING THE NEXT 10 YEARS.

AN ALTERNATE ANALYSIS OF THE POTENTIAL FOR COGNERATION AT STATE FACILITIES BASED ON THE USE OF LOW NOX GAS FIRED SPARK IGNITION ENGINES INDICATES AN OPPORTUNITY FOR 145 MW OF COGENERATED POWER AT APPROXIMATELY 32 STATE FACILITIES (NOT INCL UMA). UNDER THIS ALTERNATIVE THERE WOULD BE A NET REDUCTION IN NOX AND OTHER CRITERIA POLLUTANTS.

THE PROJECTED STATEWIDE POTENTIAL IS BASED ON AN AVERAGE USE OF APPROXIMATELY 50% OF THE AVAILABLE COGENERATED HEAT.

IT IS ANTICIPATED THAT THE IMPLEMENTATION OF COGENERATION SYSTEMS AT APPROXIMATELY 60 STATE FACILITIES COULD BE ACCOMPLISHED WITHIN THE NEXT 10 YEARS UNDER AN AGRESSIVE LEADERSHIP PROGRAM.

COGENERATION

TECHNICAL STUDY (1987)

PUBLIC HEARING - 6 AREAS (TECH., ENVIRON, INVESTMENT, O&M,
ORGN, UTIL. CONTRACT.)

REVIEW OF COGEN IN CALIF., FLA, NJ

RESULT: DECISION TO HAVE PILOT PROGRAM (3 SITES)

PILOT PROGRAM: JOINT EFFORT (DCPO, EOER, HOST STATE AGENCIES)

PURPOSE: TEST & REFINE TECH., FINANCIAL, ENVIRON, CONTRACT
ISSUES BY IMPLEMENT. & OPERATION EXP.

RESULTS: DIRECT ROLE OF STATE IN FURTHER COGEN. DEV.

REFINE CRITERIA FOR FACILITY SELECTION

CREATE MODEL PROCUREMENT DOCUMENTS & CONTRACTS

PROVIDE BASIS FOR SUCCESS UNDER ENVIRON. ACCEPT. COND.

PILOT PROGRAM PLAN:

STATE SELECTS SITES (3)

STATE PREPARES RFP (ONE FOR EA. SITE)

ADV. RFP'S SUMMER 1988

CONSULTANT SVCS. FOR PREP. OF TECH, DATA FOR EA. SITE INCL.
PROJECTED ENERGY PROFILE.

SITE CRITERIA: GOOD ENERGY EFF.
STABLE & PREDICTABLE ENERGY LOADS/CHARAC.
ENERGY CONS. IMP. COMPLETE PRIOR TO COGEN.

COMPLETE IMPL. BY EARLY 1990.

ADDITIONAL COGEN. PROJECTS TO BEGIN IMPLEMENT. EARLY 1990.

UMASS AMHERST:

EXIS. POWER PLANT LARGEST IN STATE FAC.(20MW, 300,00

NEEDS PREPLACEMENT (AGE, CONDITION)

FEAS. STUDY OF COGEN AND CONVENT. PLANT ADV. IN JAN
CONSULT. TO BE SELECTED BY DSB (PROBABLY IN MARCH)

ALT. FINANCING & OWNERSHIP OPTIONS TO BE EVAL.
DECISIONS DUE MID 1988

ADV. FOR FINAL DESIGN OR DEVELOP. PROPOSALS END OF

LONG RANGE POTENTIAL FOR COGEN AT STATE FAC.: NOT INCL UMA

ALT. 1 245 MW (3-5 YR PAYBACK) BEST ECONOMICS
$215 MILLION
HIGH OUTPUT HEAVY DIESEL ENGINES(8,000 TONS/YR NOX - NET
APPROX. 60 FAC.
SAVE 35% OF HEAT AT ALL FAC.
ACCOMODATE 25% OF NEW ENG. LOAD GROWTH NEXT 10 YRS.

ALT. 2 145 MW (3-5 YR PAYBACK) BEST ENVIRONMENT
$134 MILLION
LOW NOX GAS FIRED SPARK IGNITION ENGINES (NET NOX REDUCTION)
APPROX. 32 FAC.
SAVE 27% OF HEAT AT ALL FAC.

OPPORTUNITIES FOR COGEN. AT STATE FAC.:

50-60 FACILITIES IN 10 YEARS W/COGEN SYS.

MAJORITY OF FAC. IN 1 TO 10 MW RANGE (5 ABOVE 10 MW)
(5 BELOW 1 MW)

WIDE GEOGRAPHIC DISTRIB. IN STATE

WIDE DISTRIB. OF UTIL. TERRITORIES(INCL. MUNICIP. & PRIVATE)

FUEL AVAILABILITY VARIETY (SOME GAS, MOST #6 OIL)

SITE AREA AND FACILITY SIZES (FAC. UNDER 100,000 FT^2 EXCL.
FROM ANALYSIS) 100,000 TO 2 MILLION FT^2
51 MILLION FT^2 TOTAL FLOOR AREA

HEATING & COOLING METHODS VARY - MOST LOW PRESSURE STEAM
SOME HOT WATER AND HOT AIR

BOTH CENTRAL AND SATELLITE UTILITY SYSTEMS - MOST UNDERGROUND
CENTRALIZED STEAM DIST. SYS.

AGE, CONDITION & ENERGY EFF. VARY AMONG SITES

OPPORTUNITIES FOR REPLACING & MODIFYING THERM SYS. VARY

OPPORTUNITIES FOR SALE OF EXCESS THERMAL ENERGY VARY

TYPES OF FACILITIES VARY WIDELY:

CORRECTIONS, HOSPITALS , MR SCHOOLS, MENTAL HEALTH CENTERS

COLLEGES, OFFICE BUILDINGS, MENTAL HEALTH HOSPITALS.

OPPORTUNITIES FOR COGENERATION SYSTEMS ARE VARIED AND
CHALLENGING.